Obesity

a growing challenge

GP Conference
September 2011
Its no laughing matter!
Time trends

What’s the cost?

- “obese adults incur annual medical expenditures that are $395 (36 percent) higher than those of normal weight incur” (direct costs, US)
  
  Sturm, Health Affairs, 2002

- “obesity accounts for 2–7% of a developed countries’ total health care costs”. (direct costs, US)
  
  WHO, Technical report 894, 2000
About 69 percent of New Zealand children were not overweight or obese; while 21.3 percent were classified as overweight and 9.8 percent obese. The proportion of males who were overweight increased from 16.4 percent (5–6 years) to 23.7 percent (11–14 years) (Figure E-3).
NZ Food NZ Children

<table>
<thead>
<tr>
<th>NZDep01 quintiles</th>
<th>Obese, BMI &gt;97\textsuperscript{th} centile</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>5.1</td>
<td></td>
<td>4.3</td>
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<tr>
<td>II</td>
<td>4.3</td>
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<td>3.6</td>
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<tr>
<td>III</td>
<td>6.7</td>
<td></td>
<td>8.5</td>
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<tr>
<td>IV</td>
<td>9.5</td>
<td></td>
<td>11.5</td>
</tr>
<tr>
<td>V</td>
<td>16.1</td>
<td></td>
<td>19.5</td>
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</tbody>
</table>
Prevalence of Extreme obesity
BMI >99th centile

For 5 – 14 year olds: NZ prevalence 2.7%; US 4%

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>NZEO (n = 936)</td>
<td>0.8 (0.3-2.1)</td>
<td>0.8 (0.2-3.2)</td>
</tr>
<tr>
<td>Maori (n = 1118)</td>
<td>5.8 (3.9-8.8)</td>
<td>4.3 (2.7-6.9)</td>
</tr>
<tr>
<td>Pacific Island (n = 995)</td>
<td>11.4 (8.8-14.8)</td>
<td>10.4 (8.3-13.1)</td>
</tr>
</tbody>
</table>
The context
A framework of determinants

<table>
<thead>
<tr>
<th>Environments</th>
<th>Behaviours</th>
<th>Physiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic drivers</td>
<td>Environmental drivers</td>
<td>Energy imbalance</td>
</tr>
<tr>
<td>Policy and economic systems enable</td>
<td>Food supply and marketing</td>
<td>High food and energy consumption with</td>
</tr>
<tr>
<td>and promote high growth and</td>
<td>environments promote high</td>
<td>associated low physical activity levels</td>
</tr>
<tr>
<td>consumption</td>
<td>energy intake</td>
<td>High total energy intake pushing energy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>imbalance</td>
</tr>
<tr>
<td></td>
<td>Environmental moderators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Behaviour patterns</td>
<td></td>
</tr>
<tr>
<td>Policy interventions</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Health promotion programmes,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>social marketing, etc</td>
<td></td>
</tr>
<tr>
<td>Population effect and political</td>
<td></td>
<td></td>
</tr>
<tr>
<td>difficulty</td>
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</tbody>
</table>
What is normal?
The Quincunx

http://www.mathsisfun.com/data/quincunx.html
Quincunx

The quincunx is an amazing machine. Pegs and balls and probability!
Have a play, then read the Quincunx Explained.
Measuring obesity?

- Height/weight
- Body Fat
- Skin fold thickness
- Abdominal circumference
- Body Mass Index

- BMI = 25, in a 10 year old?
  - OK or not?
Body mass index

- Weight (kg) / [Height (m)]^2
- E.g. ht 130 cm, wt 42.5 kg.
- BMI ~ 25.
Scenario

10 yo girl, very overweight
- Mother a little overweight, self-manages
- Father normal weight
- Mother’s sisters, brother, grandmother overweight and family history of Type 2 IDDM and heart disease
- Girl’s behaviour deteriorating, isolation from peers.
- Attempted dieting strategies, concerned about future health and current state of unhappiness.
- “What are the specific health risks?”
Acanthosis nigricans
Multisystem disorder

Respiratory
- Sleep apnoea, Pickwickian syndrome, Asthma

Cardiovascular
- raised BP, disordered lipids, LVH

Gastrointestinal
- Fatty liver, GOR, Cholelithiasis

Orthopaedic
- Slipped epiphysis, Blounts disease (tibia vara),
  - tibial torsion, flat feet, sprains

Neurological
- Raised intracranial pressure

Endocrine
- Insulin resistance… NIDDM,
  - disordered menstruation, PCOS, Hypercortism

Systemic
- Raised CRP
Bogalusa Heart Study

- 1972 – 2005
- Long term population study
- Origins of heart disease
- Childhood obesity noted as a major risk factor
- Cumulative exposure over time… the life-course model
### Cardiovascular/IDDM Risk

BMI > 95%ile in school children;

<table>
<thead>
<tr>
<th>Factor</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated diastolic</td>
<td>2.4</td>
</tr>
<tr>
<td>Elevated LDL</td>
<td>3.0</td>
</tr>
<tr>
<td>Reduced HDL</td>
<td>3.4</td>
</tr>
<tr>
<td>Elevated systolic</td>
<td>4.5</td>
</tr>
<tr>
<td>Elevated triglycerides</td>
<td>7.1</td>
</tr>
<tr>
<td>Decreased fasting insulin</td>
<td>12.6</td>
</tr>
</tbody>
</table>

58% two or more factors

Freedman et al., Pediatrics 1999; 103: p.1175-82
The Relation of Overweight to Cardiovascular Risk Factors Among Children and Adolescents: The Bogalusa Heart Study
NZ clinical guidelines

1. Raise awareness
   - Engage
   - Measure BMI

2. Identify need and context for action
   - Clinical risks
   - Further Ix

3. Options for action
   - Family lifestyle change
   - Food/balanced diet
   - Physical Activity
   - Behaviour strategies

4. Maintain contact and support
   - Maintain
   - Monitor progress
   - Re assess, and restart

Jull et al. JPHC, 2011, Clinical guidelines for weight management
Guidelines Key themes:

- Improving lifestyles by engaging with family/whanau values and beliefs
- Achieved through mana-enhancing relationships with family /whanau
- Motivational interviewing in successful interventions
Obesity: diagnosis, prevention and treatment

- Diagnosis
  - BMI centile is useful diagnostically – practical, objective, biologically meaningful
  - Normal BMI lower in childhood and rises through adolescence

- Prevention: complex, multifaceted population level interventions: resource intensive and variable outcomes

- Treatment: increasing evidence for ‘hard work programmes’

Do you see what I see?

- Step one: awareness
- Parents do not always recognise their child is overweight or obese
- Overweight parents – less likely to recognise…
- Health professionals may also not recognise…

Maximova et al. *Do you see what I see?* Int J Obesity. 2008 32:1008-1015
How did we get here?

History

- Medical history
- Activity level
- Screen time
- Sleep
- Dietary habits / nutrition
Where are we at? Examination

- Ht, Wt, ... BMI
- Blood pressure (large cuff)
- Skin – acanthosis nigricans
- Oropharynx, teeth
- Hepatomegaly
- Pubertal stage
- Joints and mobility
What else do we need to know?

Investigations

- Labs
  - Fasting glucose, lipids, LFT, TFT

- Other co-morbidities
  - E.g. Obstructive Sleep Apnoea, joints etc.
What are we going to do about it?

Interventions

- **Nutritional targets**
  - ↓ frequency of meals outside home
  - ↓ intake sweet drinks
  - ↓ portion size
  - ↓ access to high energy density foods

- **Activity targets**
  - ↑ moderate activity per day
  - Participation of parents in active behaviours
  - ↓ screen time
  - self-monitoring of activity
NZ Guidelines

• Major approaches

  • Lifestyle (Family/Whanau - Food, Activity, Behaviour)
    • Dietary
    • Physical activity
    • Behavioural Strategies

  • Pharmacotherapy

  • Bariatric surgery
FAB – family/whanau

- Strong evidence for the comprehensive approach
- ‘Growing into weight’ to reduce BMI
- Evidence for combined approach stronger than individual elements
Behavioural approaches

- Self monitoring
- Stimulus control
- Problem solving
- Contingency management or contracting
- Cognitive restructuring

- Strong evidence, especially at family level approach
Pharmacotherapies

- No weight loss drugs are registered for use in children
- Weak evidence
- Clinical trials for 12 yrs +
  - ORLISTAT – GI lipase inhibitor
  - SIBUTRAMINE – Serotonin/ NA reuptake inhibitor
Bariatric Surgery

- Gastric banding, sleeve gastrectomy, Roux-en-Y bypass

- 50kg/m$^2$

- ‘Physiologically mature’

- Commitment to lifestyle change

- Not usually appropriate

Programmes

- Some promising examples
- ‘Field’ community application of the evidence
‘WATCH IT’ programme

- Leeds, UK: Ruldoph and colleagues
- Moderately to severe obese children
- Disadvantaged communities
- Mean age 12.0 yrs
- Reduction BMI ↓ 0.07-0.13 SD at 6 months
- Qualitative increase in self-confidence, friendships and reduced self-harm
- Delivered by health trainers, supervised by health professionals
‘HIKCUPS’ trial

- Australian, multicentre, RCT

- Three groups
  1. Parent centred dietary modification
  2. Child centred physical activity development
  3. Programme with 1 & 2

- BMI reduced at 12/12
  1. SD $\downarrow$ $-0.39$ $[-0.51$ to $0.27]$
  2. SD $\downarrow$ $-0.32$, $[-0.36$, $-0.23]$
  3. SD $\downarrow$ $-0.17$ $[-0.28$, $-0.06]$
Project Energise

- Early indications good
- Waikato schools, activity and nutrition intervention
- Demonstrable benefits 6 yrs into study
- 44,000 children, 244 schools, 27 “Energizers” and 1 dietitian.
- Energizers act as a ‘one stop shop’ to support activities that promote and coordinate improved nutrition and physical activity within schools.
- less than $40 per child each year.
- 3% less obesity and overweight prevalence, faster 550m running…

1. Raise awareness

Engage

Measure BMI

As part of routine clinical practice using US-CDC BMI-for-age-and-sex percentile charts:
- raise profile
- prompt discussion

? 85th percentile

2. Identify need and context for action

Review clinical risks:
- Age
- Parental obesity
- Family history of CVD
- Weight-related problems eg joint problems, psycho-social problems (eg isolation, depression), snoring

Review need and context:
- Family/whanau context
- Living arrangements
- Weight related concerns (eg bullying)
- Nutrition and sedentary behaviour and physical activity

If indicated from current risks:
- Undertake full history and clinical examination

Only if BMI > 95th and specific indications eg family history of dislipidaemia.

Further investigations:
- Fasting lipids and glucose
- Sleep studies
3. Determine options for action

**BMI-for-age and -sex percentile (CDC charts)**
- 85th percentile
- 95th percentile

4. Maintain contact and support

- **Maintain**
  - Healthy diet
  - Physical activity > 60 minutes/day

- **Monitor progress**
  - Track healthy behaviour and measure weight/height quarterly

- **Reassess & restart**
  - Weight management if percentile BMI starts increasing

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**Change lifestyle - Family/whanau FAB**

- **Family/whanau FAB** - 1. Food/balanced diet, 2. Physical Activity, 3. Reduced sedentary Activity, and 4. Behaviour strategies
- Must involve family/whanau
- Adapt for family/whanau lived reality
- Consider family/whanau and community settings

May consider specialist referral in exceptional cases

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Clinical guidelines, NZ, MOH, 2009
Improving lifestyles by engaging with family / whanau values and beliefs
Achieved through mana enhancing relationships with family / whanau

1. Raise awareness

Engage

Measure BMI

As part of routine clinical practice using US-CDC BMI-for-age-and-sex percentile charts
- raise profile
- prompt discussion

? 85th percentile

1 Primary health care, community health workers, schools, secondary care, through marae, via places of

2 When lifestyle interventions have failed and significant co-morbidities or risk factors exist

2. Identify need and context for action

Review clinical risks
- Age
- Parental obesity
- Family history of CVD
- Weight-related problems eg joint problems, psychosocial problems (eg isolation, depression), snoring

Review need and context
- Family/whanau context
- Living arrangements
- Weight related concerns (eg bullying)
- Nutrition and sedentary behaviour and physical activity

If indicated from current risks
- Undertake full history and clinical examination

Only if BMI > 96th and specific indications eg family history of dyslipidaemia

Further investigations
- Fasting lipids and glucose
- Sleep studies

3. Determine options for action

BMI-for-age and -sex percentile (CDC charts)
- 85th percentile
- 96th percentile

Change lifestyle - Family/whanau

FAB
- 1. Food: balanced diet
- 2. Physical Activity
- 3. Reduced sedentary Activity
- 4. Behaviour strategies

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Adapt for family / whanau lived reality
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- Weight management if percentile BMI starts increasing

Reassess if other risk factors present
Its small steps walked together, that produce these results, small steps by some measures, results in big strides in our lives.

By Rob Bear.